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# **USMC Initiatives in Energy and Power**

**Michael Gallagher  
Program Manager - Expeditionary Power Systems  
Marine Corps Systems Command**

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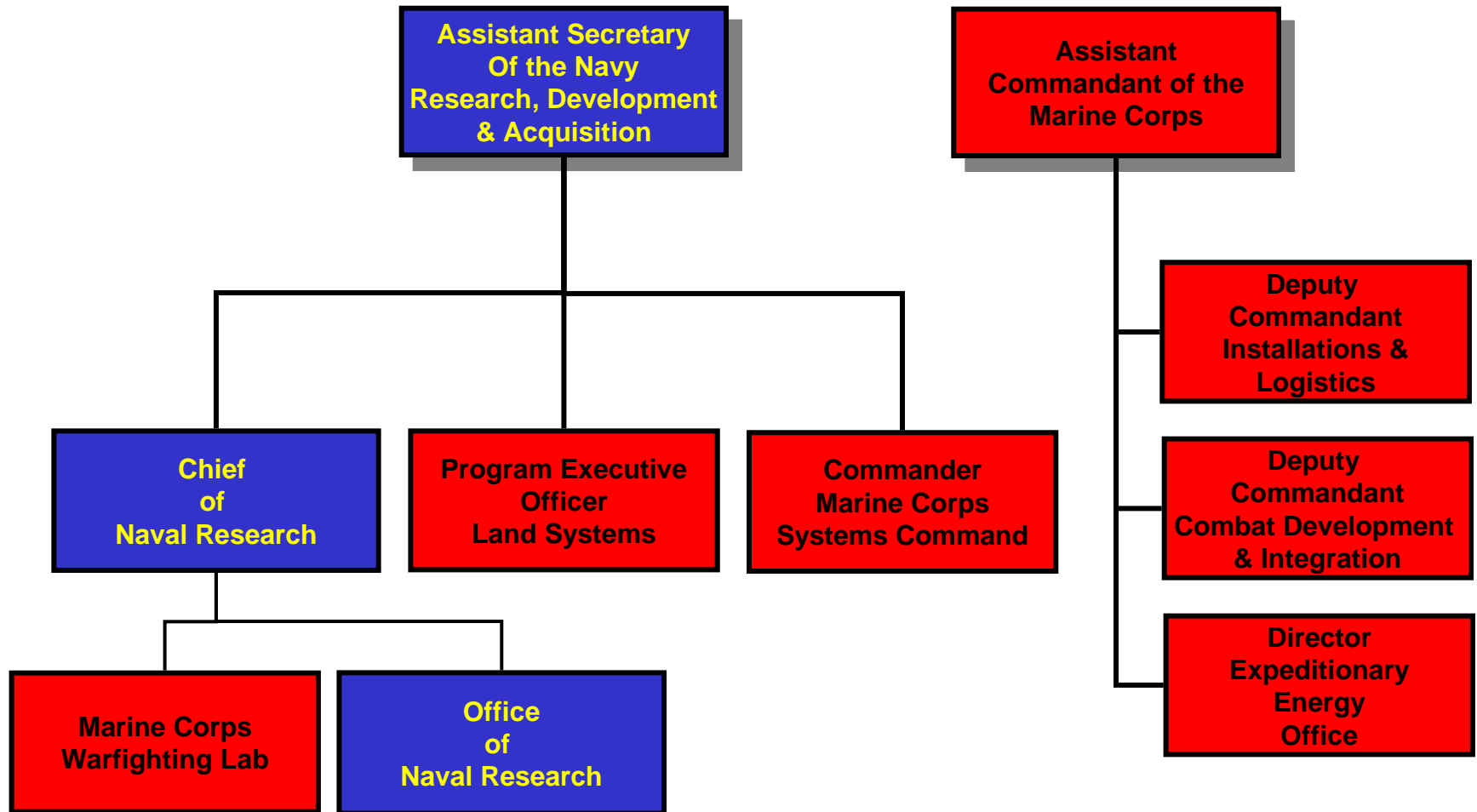
# Discussion Topics

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- **USMC Organizations in Power & Energy**
- **Key Power and Energy Drivers**
- **Naval Lithium Battery Safety Program**
- **Business Opportunities**
- **Acquisition Programmatic Considerations**

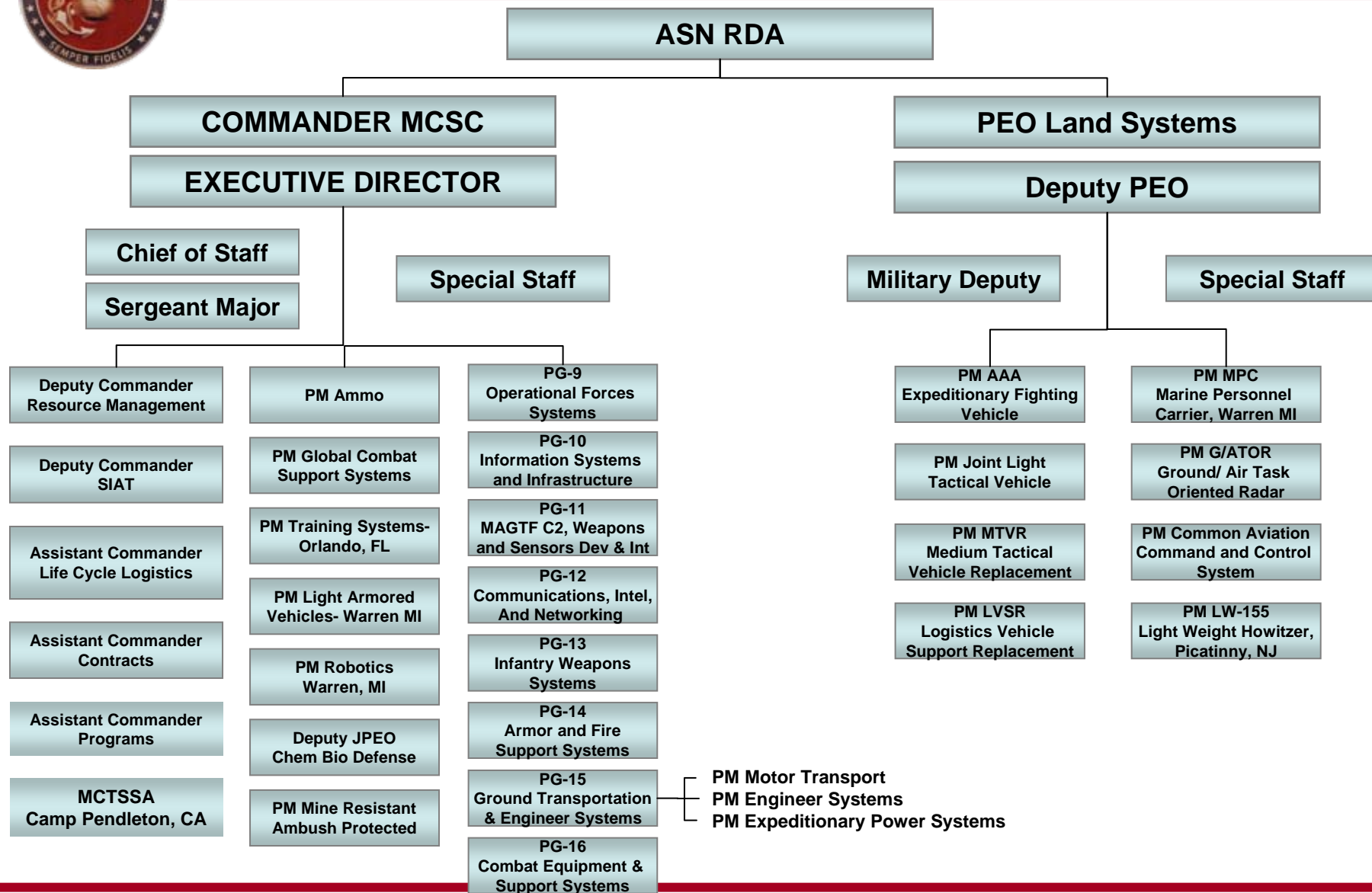


# USMC Organizations in Power and Energy



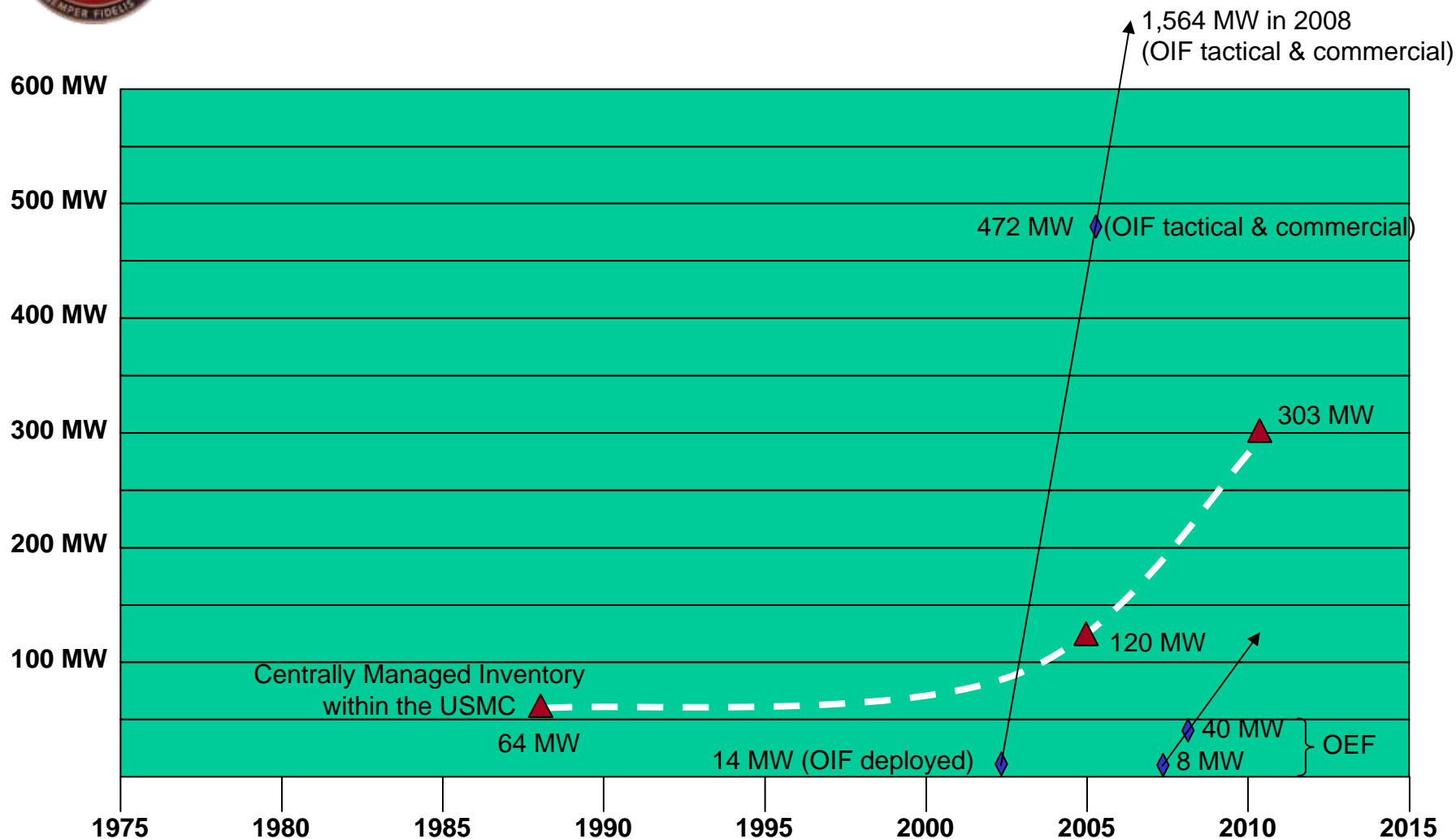


# USMC Acquisition Organizations





# USMC Power Generation Capability





# Individual Power Needs



**AN / PVS-17  
AA Battery**



**AN / PVS-14  
AA Battery**



**AN / PAS-13D  
AA Battery**



**AN / PEQ-16A  
DI-123A Battery**



**Hand-held flashlight  
AA Battery**



**MIOX Water Purifier  
AA Battery**



**AN / PSC-13 D-DACT  
Unique or AA Battery**



**DAGR  
AA Battery**



**AN / PRC - 148 or 152  
Unique Batteries**



**AN / PRC-153  
Unique Battery**



**Quiet Pro Headset  
Unique Battery**



**Squad Digital Camera  
Unique Battery**



**AN / PRC-117F  
BA-5590 / BA-5390 / BB-2590 Batteries**

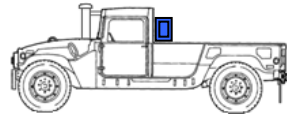


**Rugged Laptop  
Unique Battery**



# Pre-OIF Radio Density

## Co HQ (x3/Bn)

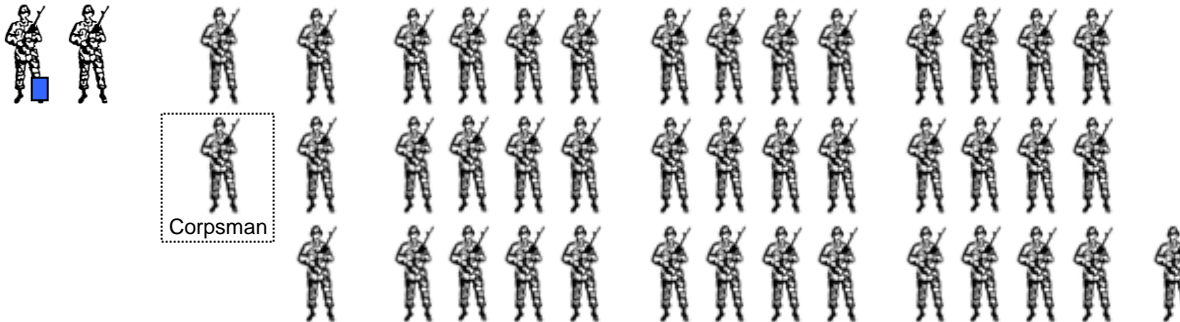


Mounted in M998A1

T/O 6 Officer/176 Enlisted

	VHF-V (VRC-88):	1
	VHF-M (PRC-119):	7
	UHF-M (PRC-113):	1

## RFL Plt (x3/Co x9/Bn)



### Radio Weights

PRC-119 - 22.5 lbs

PRC-113 - 16.7 lbs

\* w/batteries

## WPNS Plt (x3/Bn)

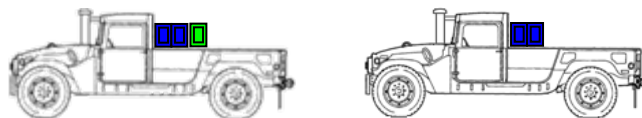
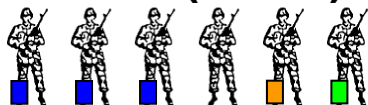






# Tactical Communications Modernization

## Co HQ (x3/Bn)



Mounted in M1123A2s

T/O 6 Officer/176 Enlisted

■	MBR-V (VRC-103):	1
■	MBR-M (PRC-117):	6
■	HFMR (PRC-150):	5
■	DVA (VRC-110):	2
■	THHR (PRC-148/152):	35
■	IISR (PRC-153):	176

## RFL Plt (x3/Co x9/Bn)

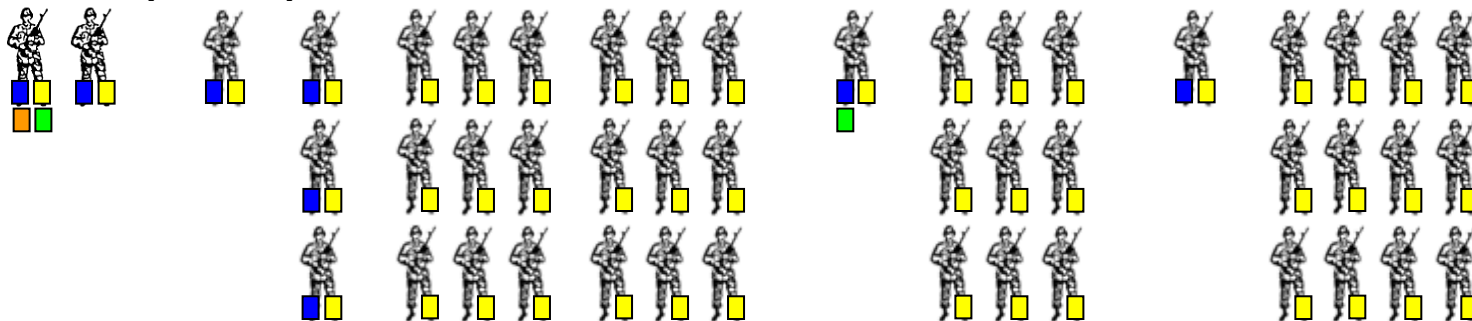


\*Corpsman IISR counted in H&S

### Radio Weights

PRC-150 - 15.7 lbs  
 PRC-117 - 15.9 lbs  
 PRC-152 - 2.4 lbs  
 PRC-153 - 1 lbs  
 \* w/batteries

## WPNS Plt (x3/Bn)



MG Sect

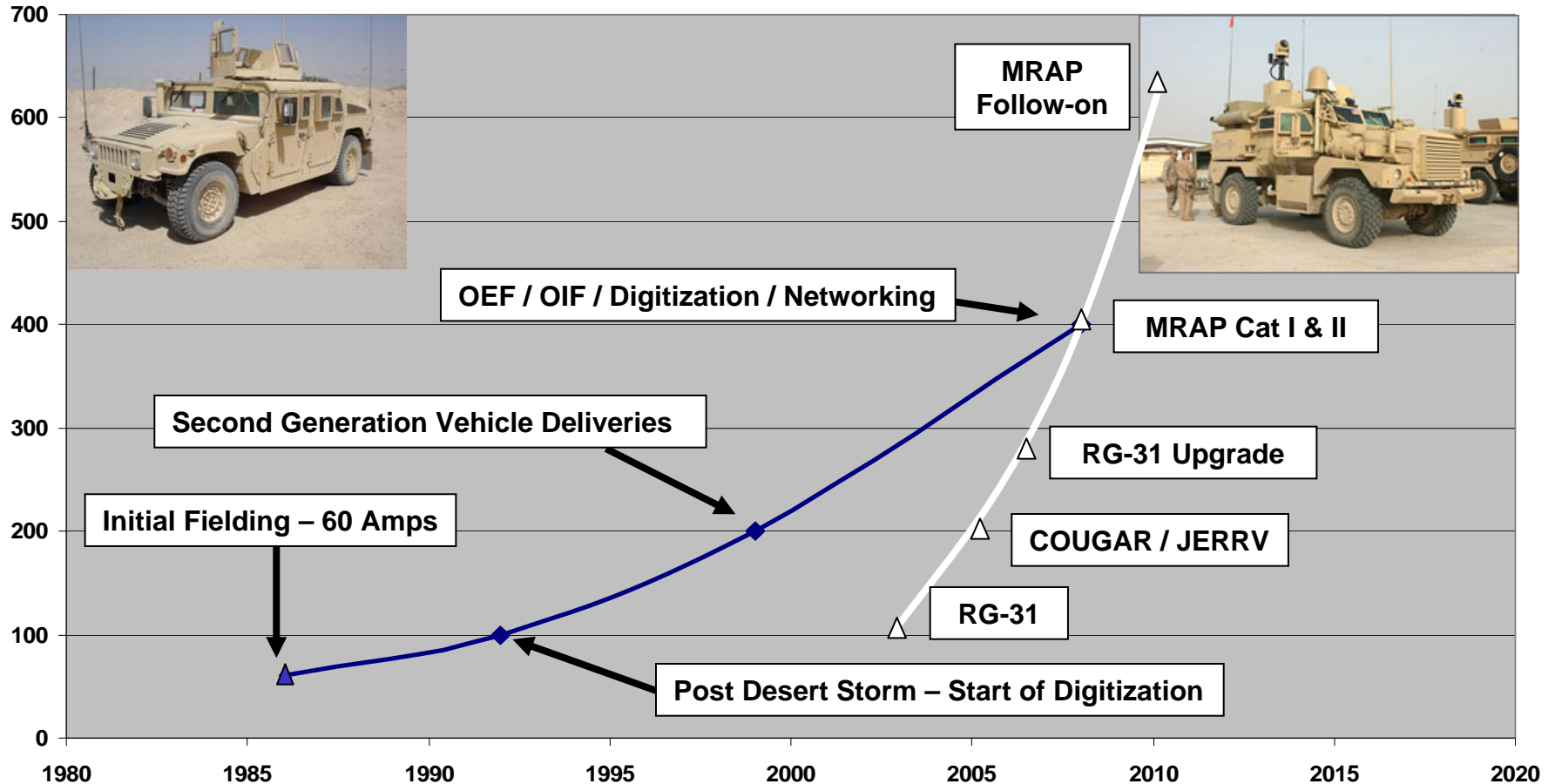
Mortar Sect

Assault Sect



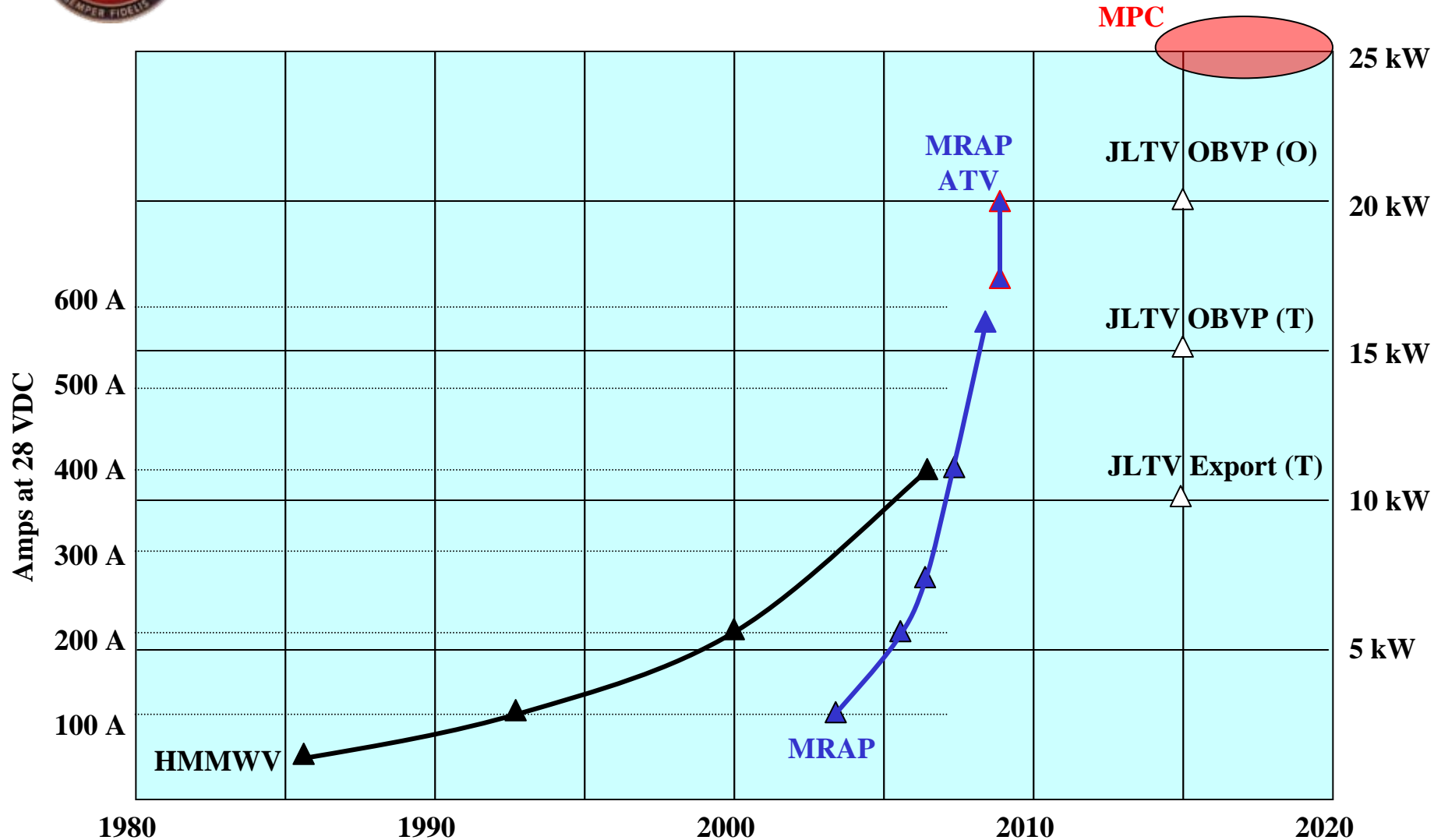
# Vehicle Power Needs

## Alternator Amperage Rating on HMMWV / MRAP at 28 VDC





# Vehicle Power Needs





# Renewable Energy Investments

**Internal**  
**< 10 Watts**



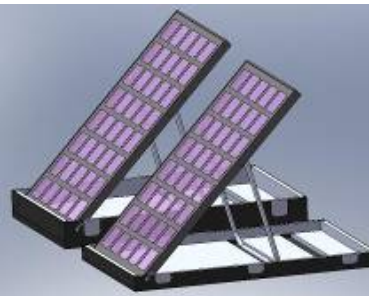
**Not Feasible**

**Carried**  
**10 - 100 Watts**



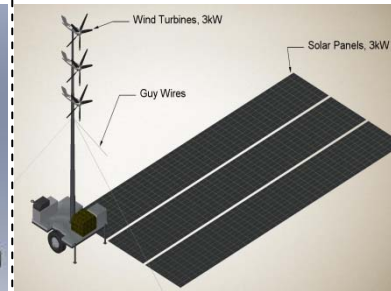
**SPACES**  
**2009/10**

**Portable**  
**100 - 1000 Watts**



**GREEN**  
**2010/11**

**Generator**  
**1 - 100 kWatts**



**DREAM (2007)**  
**TREP (2012)**

**Stationary**  
**> 100 kWatts**



**Not Tactical**



# Secretary of the Navy Energy Goals

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## New Requirements for Acquisition Processes

- Mandatory evaluation factors used when awarding contracts for platforms, weapon systems, and buildings will include: Lifecycle energy costs, Fully-burdened cost of fuel, Contractor energy footprint

## Sail the “Great Green Fleet”

- DON will demonstrate a Green Strike Group in local operations by 2012 and sail it by 2016

## Reduce Petroleum Use in Non-Tactical Vehicles

- By 2015, DON will reduce petroleum use in the commercial fleet by 50%

## Increase Alternative Energy Ashore

- By 2020, DON will produce at least 50 percent of shore-based energy requirements from alternative sources

## Increase Alternative Energy Use Navy-wide

- By 2020, 50 percent of total DON energy consumption will come from alternative sources



# Mobile Electric Power

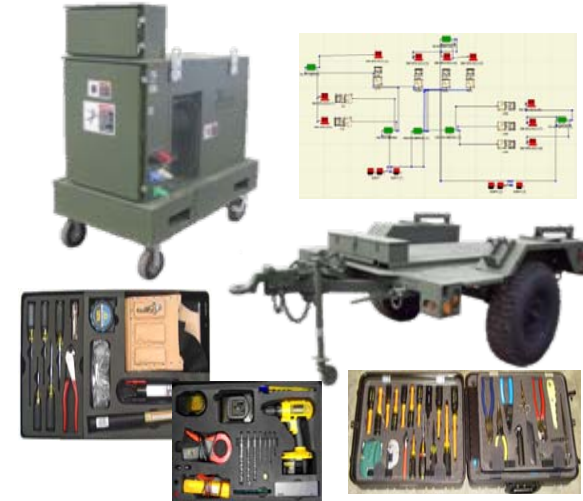
**DOD Standard Generators**



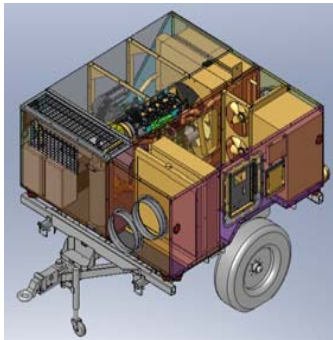
**USMC Unique Generators**



**Tools / Customer Support**



**Integrated Trailer  
ECU - Generator**



**Power Distribution**



**Floodlight Sets**







# Environmental Control Equipment

**Environmental Control Units**



**Special Customer ECUs**



**Field Refrigeration**



**In-Field Ice Making  
(food service, mortuary affairs)**



**Tools / Customer Support**





# Advanced Power Sources

## Radio Power Adaptors



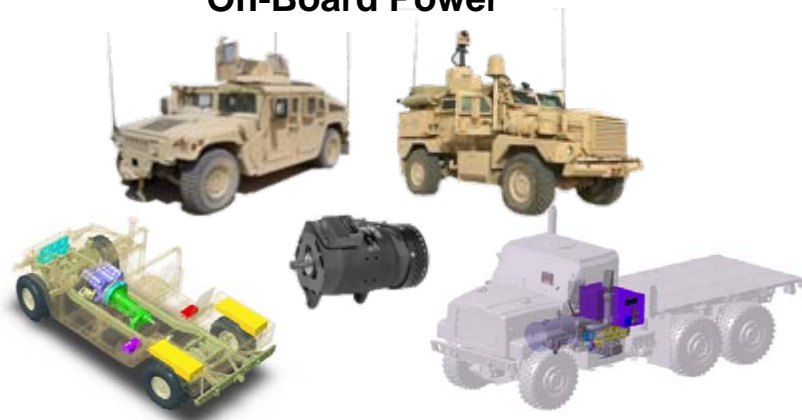
## Power Supplies



## Renewable Energy



## On-Board Power



## Battery Management / Sustainment Systems







# Expeditionary Power Systems Reset

## TQGs 5-60 kW (Joint)

Tactical Quiet Generators (2<sup>nd</sup> Gen Military)

## AMMPS 5-60 kW (Joint)

Advanced Medium Mobile Power Sources (3<sup>rd</sup> Gen)

## 2/3 kW MTG/TQG (Joint)

Military Tactical Generator / Tactical Quiet Generator

## 100 kW TQG (Joint)

Tactical Quiet Generator (2<sup>nd</sup> Gen)

## MMG 25 MTG (USMC)

Military Tactical Generator (UUNS / POR)

## ITEG (USMC)

Integrated Trailer-ECU-Generator (1<sup>st</sup> Gen)

## ITEG II (USMC)

Integrated Trailer-ECU-Generator (2<sup>nd</sup> Gen)

## Floodlight System (USMC)

(1<sup>st</sup> Gen & 2<sup>nd</sup> Gen)

## MEPDIS (USMC)

Mobile Electric Power Distribution (1<sup>st</sup> Gen & 2<sup>nd</sup> Gen)

## Family of ECUs (USMC)

Environmental Control Units (1<sup>st</sup> Gen & 2<sup>nd</sup> Gen)

## Family of ECUs (USMC)

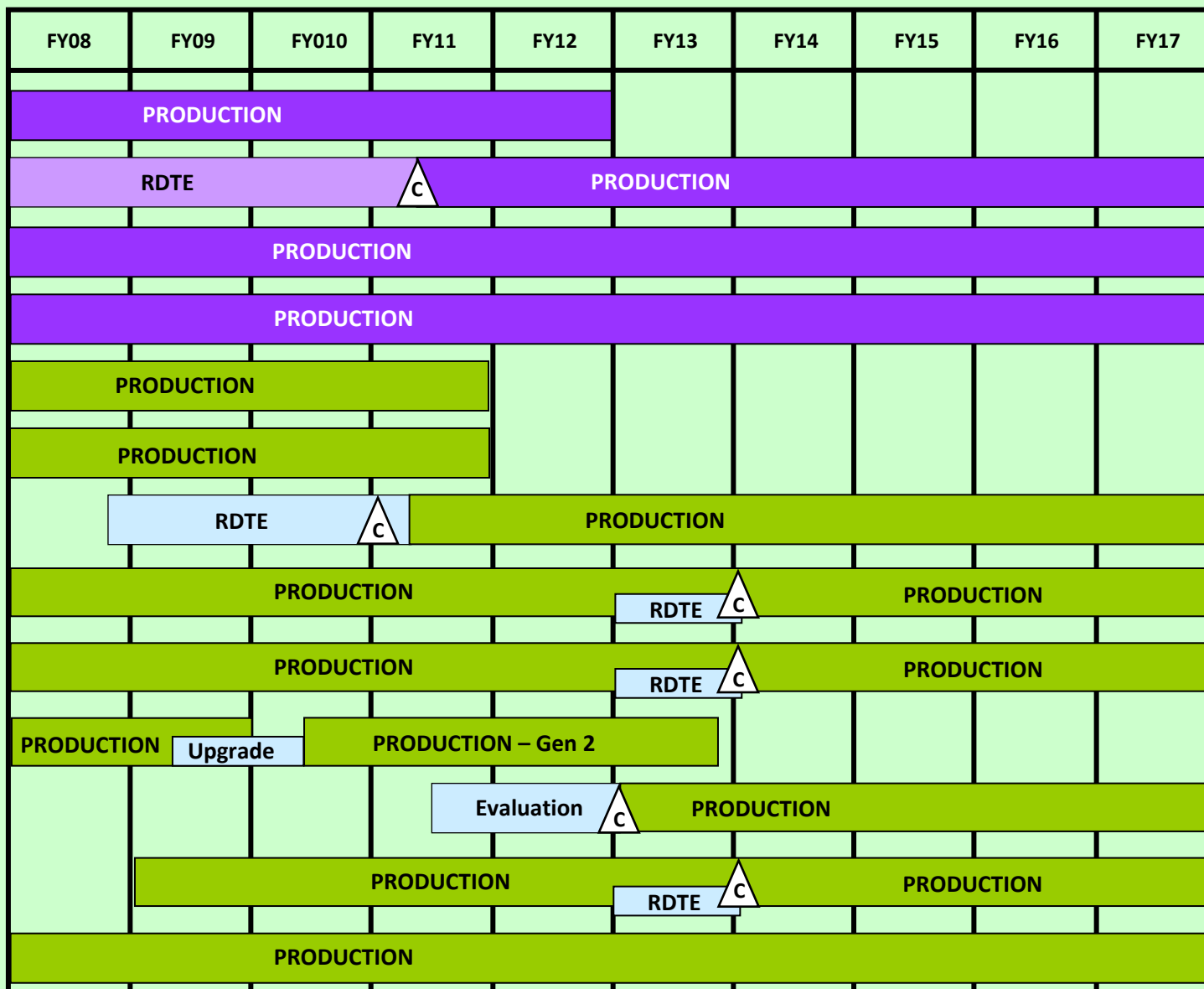
Environmental Control Units (3<sup>rd</sup> Gen)

## Family of FRS (USMC)

Field Refrigeration Systems (1<sup>st</sup> Gen & 2<sup>nd</sup> Gen)

## Support Equipment (USMC)

Toolsets / Loadbanks / Modification Kits (continual buy)





# Expeditionary Power Systems Reset

## Military Battery Chargers

- Vehicle Mounted
- Ruggedized Garrison
- Special Purpose

## Lead Acid Battery Mngt

- Chargers / Analyzers
- On-site training

## Radio Power Adaptors

- Hand-held
- Man-portable
- Multi-radio

## Family of Power Supplies

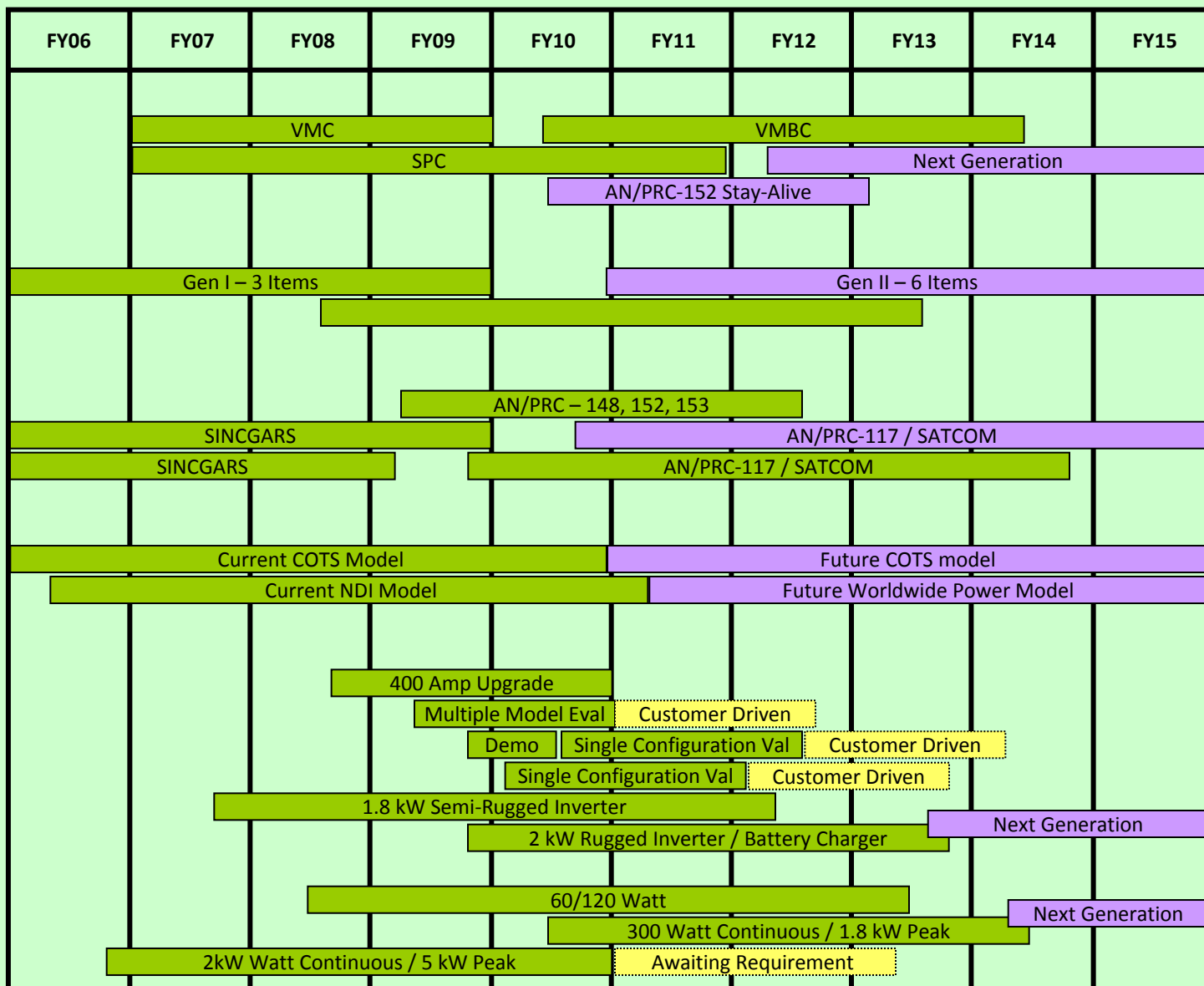
- Garrison / Benchtop
- Ruggedized

## On-Board Vehicle Power

- HMMWV Upgrade
- APU
- HMMWV 30 kW
- MTRV 120 kW
- DC-AC Inverters

## Renewable Energy Sources

- Man-portable (SPACES)
- Modular (GREEN)
- Trailer Mounted (DREAM)





# Experimental Forward Operating Base

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- **Intent:**
  - Design and build scalable small to large FOB prototype
  - Test, evaluation, operational experimentation with various configurations
- **First Round ExFOB Demonstrations:**
  - February – March 2010
  - Conducted in Quantico VA
  - 90 proposals evaluated / 27 demo'd
    - Power Generation
    - Water purification, packaging, storage
    - Shelters and shelter efficiency
- **Second Round ExFOB Demonstration:**
  - August 2010 in 29 Palms, CA (RFI to be released by ONR)
  - Desire to address:
    - Microgrids
    - Alternative cooling methods in desert environments





# Naval Lithium Battery Safety Program

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- **Applies to Every Program in Department of Navy / USMC which has a lithium battery**
  - **No matter how small or how large.**
- **Approval must be obtained before the systems is:**
  - **Used by DoN/USMC personnel.**
  - **Tested with or on DoN/USMC equipment and facilities**
- **Approvals are specific to:**
  - **A battery design**
  - **A system (certain vehicle, type of radio, etc.)**
  - **A platform (surface ship, ground, sub, air)**



# Naval Lithium Battery Safety Program

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- **What governs the Naval Lithium Battery Safety Program**
  - **Naval Sea Systems Command Instruction**
    - **NAVSEAINST 9310.1b / Defines the Process**
  - **Naval Sea Systems Command Technical Manual**
    - **Technical Manual S9310-AQ-SAF-010 / Latest version of 19 Aug 04**
    - **Guidelines for Design, Review and Testing**
  - **MCSC Acquisition Policy Letter**
    - **Policy Letter No. 3-04 / Implements the Department of the Navy LBSP**

**All documents available at [www.marcorsyscom.usmc.mil/sites/pmeps](http://www.marcorsyscom.usmc.mil/sites/pmeps)**



# Who Are The Players?

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- **Approvals Granted by – NOSSA**
  - **Naval Ordnance Safety and Security Activity, Code N841**
- **Special Authority for Specific Platform Use:**
  - **NAVSEA Code 07T2 for Submarine Carriage**
  - **NAVAIR 4.4.4.1 for Aircraft Carriage**
- **Primary Testing and Evaluation Sites**
  - **Carderock Division, NSWC, Code 616**
  - **Crane Division, NSWC, Code 609**
- **PM-Expeditionary Power Systems (EPS) is USMC focal point**



# Exceptions and Exemptions

## (TM-S9310 Section 1.3)

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- **Exemption - Lithium Ion Batteries Used in COTS**
  - UL listed, unmodified electronics using OEM charging device
  - No more than 18 V ( $\leq 4$  series cells)
  - No more than 100 Wh
- **Exemption - Coin Cells (Naval Msg 011731Z MAR 06)**
  - Commercial available cell, in unmodified device
  - Single primary cell configuration
  - $\leq 3$  volt
  - $\leq 1$  Ah capacity
- **Exception - Small  $\leq$  Two Identical Primary Cell Applications (non-rechargeable)**
  - No more than 1.5 Ah/cell
  - COTS Item :
    - must be UL listed and unmodified
  - Navy Specific item:
    - No other source of power or electrically protected (i.e. diodes)



# Acquisition Opportunities

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- **Next Generation, Self-contained, Tactically Deployable Floodlight**
- **Mobile Electric Power Distribution System Rebuy**
- **Family of Environmental Control Units**
- **Ruggedized Suitcase Battery Chargers (military batteries)**
- **Special Purpose Battery Charger (AN/PRC-152 battery in storage)**
- **Lead Acid Battery Chargers / Analyzers**
- **AN/PRC-117F/G Radio Power Adaptors**
- **Commercial Benchtop / Lab Power Supply**
- **Ruggedized Power Supply with Worldwide Power Input**
- **Improved Battery System (large format, high energy density)**
- **On-Board ship battery storage / charging / self-containment**
- **Tactical Renewable Energy Program (TREP - Trailer Mounted) – ONR BAA**
- **Tactical Generator Microgrid - ONR BAA**
- **ExFOB Hardware Demonstration - ONR RFI – Late May**





# Acquisition Opportunities

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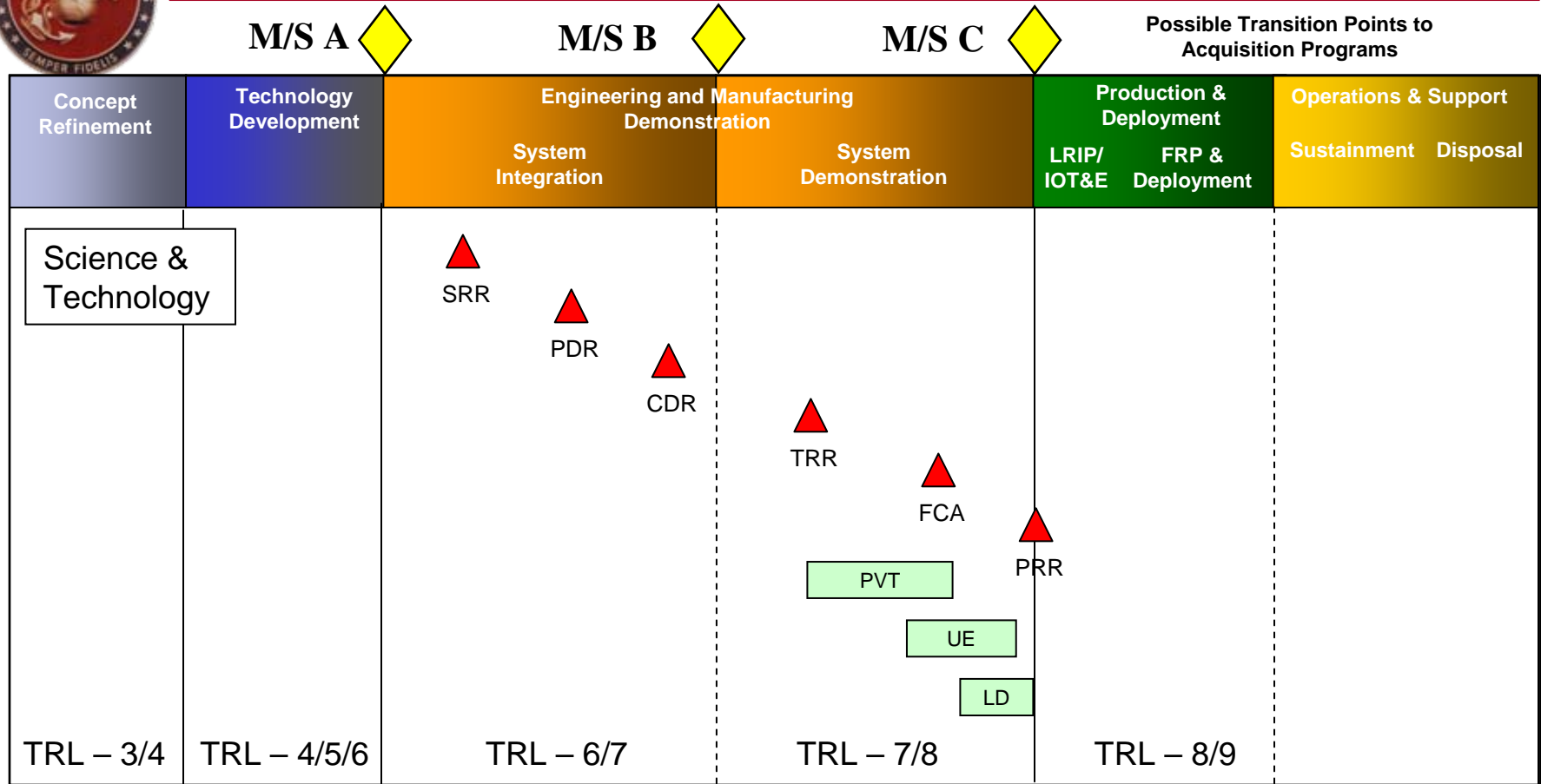
- **Keep your eyes on FedBizOpps and GSA Advantage**
- **Sources Sought / RFI notices will precede official RFP**
- **Will follow Acquisition Guidelines for source of supply**
  - **Mandated sources**
  - **Federal Schedules**
  - **Small Businesses / Disadvantaged Businesses**
  - **Open Competition**
  - **Limited Competition**



# Acquisition Strategies

	Joint	USMC Dev'l	USMC Non-Dev'l
<ul style="list-style-type: none"> <li>Radio Power Adaptors</li> <li>Battery Management and Sustainment Systems</li> <li>Solar / Renewable Power Adaptors</li> <li>On-Board Vehicle Power Systems</li> <li>Family of Power Supplies</li> <li>Mobile Electric Power Generating Sources</li> <li>Lightweight Man-Portable Generator</li> <li>Mobile Electric Power Distribution</li> <li>Field Wiring Harness</li> <li>Floodlights</li> <li>OIF 15/22 kW HMMWV Towable Generator</li> <li>Generator Synchronizing Unit</li> <li>Electrician Toolkit</li> <li>Generator Loadbank</li> <li>Lithium Battery Systems / Safety Systems</li> </ul>	 X X X  X X X      X	 X X X X X X  X  X X X  X	  X  X      X    X

# Acquisition Phases

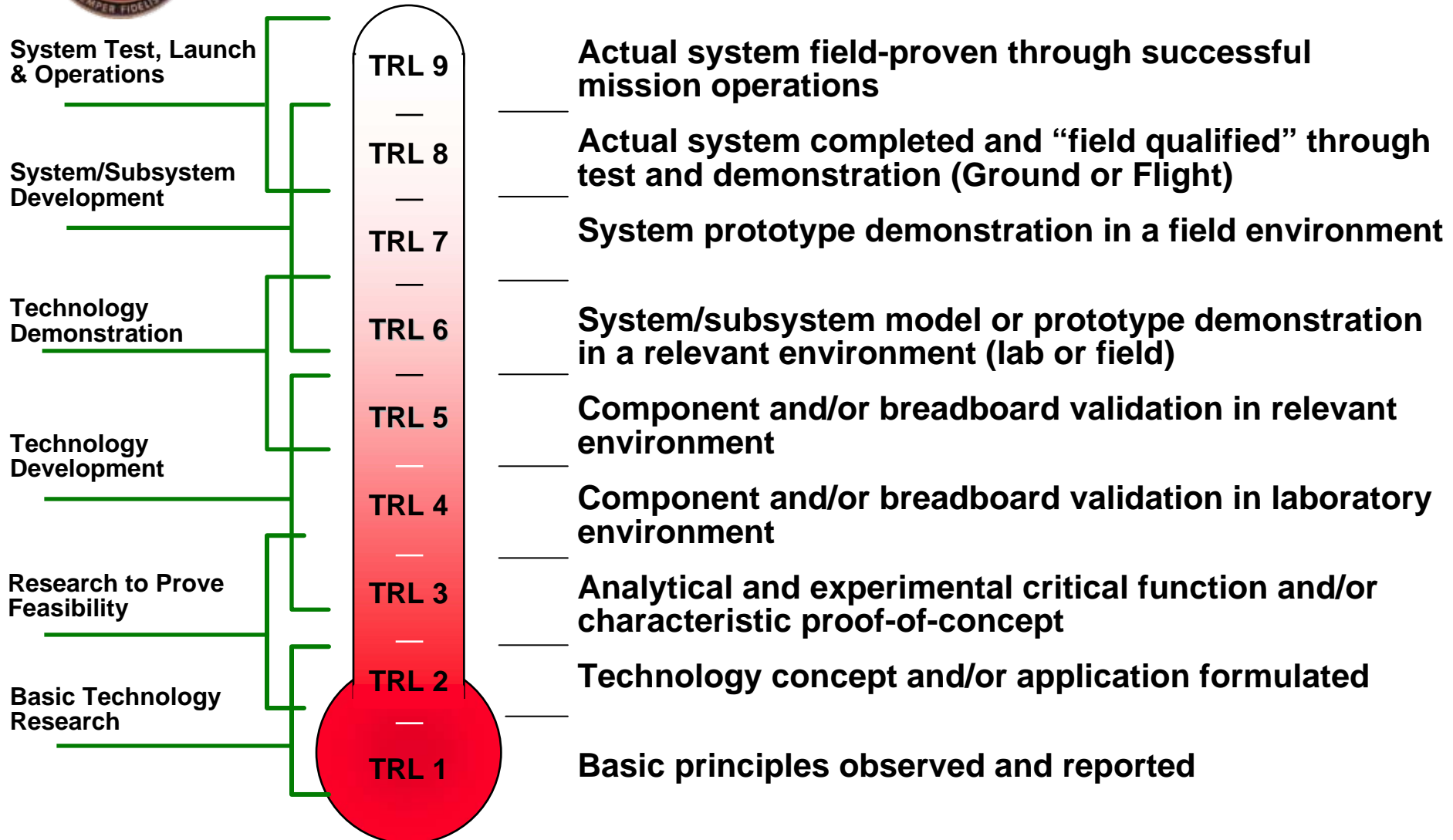


CDR - Critical Design Review  
 FCA - Functional Configuration Audit  
 FRP - Full Rate Production  
 IOT&E - Initial Operation Test & Evaluation  
 LD - Logistics Demonstration  
 LRIP - Low Rate Initial Product  
 PAC - Post Award Conference

PDR - Preliminary Design Review  
 PRR - Production Readiness Review  
 PVT - Production Verification Testing  
 SRR - System Requirements Review  
 S&T - Science and Technology  
 TRL - Technology Readiness Level  
 TRR - Test Readiness Review  
 UE - User Evaluation



# Technology Readiness Levels





# Acquisition Planning

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- **Business Strategy**
  - How fast are items needed?
  - How defined, understood and available is the end item?
  - How often are items needed (One-time-buy, Life-of-item buy, Interim solution)?
  - Who is the customer? (defined, varied, unpredictable)
  - Joint Service interests / Other service lead / USMC lead
- **Acquisition Strategy**
  - Market Research should define / focus the strategy
  - Method for Performance Specification
  - Method for Work Scope Specification
- **Contracting Strategy**
  - Streamlined Acquisition
  - Commercial Item procurement
  - Competitive vs Sole Source Procurement
  - Federal Supply Schedule procurement (GSA)
  - Military Interdepartmental Procurement Request (MIPR)



# Specifications / Statements of Work

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## Specification Types

- **Performance Specification (MIL-PRF)**
- **Program Unique Specification**
- **Military Standard (MIL-STD)**

} You build  
to our  
spec

- **Purchase Description**
- **Commercial Item Descriptions (CIDs)**

} You tell us  
what you  
will build

## Work Statement Types (MIL-HDBK-245D for guidance)

- |                                    |               |
|------------------------------------|---------------|
| – <b>Statement of Work</b>         | - Do as I say |
| – <b>Statement of Objectives</b>   | - You tell me |
| – <b>Broad Agency Announcement</b> | - You tell me |



# In Closing.....

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- Points of Contact:

- Program Manager: michael.a.gallagher@usmc.mil
- Mobile Power / ECU Team Lead: robert.h.mckenzie@usmc.mil
- Advanced Power Team Lead: malar.motley@usmc.mil
- Lead Engineer: jonathan.carpenter@usmc.mil
- Capabilities Officer: clifton.harris@usmc.mil

Questions?